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ABSTRACT

This report examines the determinants of child labor in conjunction with school participation trends for children ages 7-14 in Ghana. The report is based on data from national household surveys conducted 1987-92. Specifically, the study examined the influence of variables such as child age and sex; parent's education, religion, and employment; and place of residence (rural or urban) on child labor and participation in school. About 28 percent of children ages 7-14 in Ghana were involved in child labor. Child labor had a direct impact on school participation. During 1992 one of every three girls and one of every three boys did not attend school in urban Ghana, while 37 percent of girls and 28 percent of boys did not attend school in rural areas. However, of the 28 percent of children involved in child labor, more than two-thirds were involved in school. The majority of child labor in Africa, and especially in Ghana, is unpaid work and takes place in family agricultural enterprises. Data indicate that 90 percent of children in Ghana between the ages of 7-14 were involved in household chores. The study did not demonstrate that poverty is the main culprit in child labor; in contrast, poverty did affect the decision to school. The high cost of schooling and the low quality and weak relevance of education have pushed many children into work. Among family characteristics, father's education had a significant negative effect on child labor, particularly for girls. Increasing demand for schooling is an effective way of reducing child labor and ensuring that Ghana's human capital is stabilized. Appendices include definitions and descriptive statistics of variables. (Contains 31 references and 19 data tables and figures.) (LP)

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CHILD LABOR AND SCHOOLING IN GHANA

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RC 022198

1844. Child Labor and Schooling in Ghana

Sudharshan Canagarajah and Harold Coulombe
(November 1997)

To improve human capital and reduce the incidence of child labor in Ghana, the country's school systems should reduce families' schooling costs, adapt to the constraints on schooling in rural areas (where most children must work at least part-time), and provide better education (more relevant to the needs of the labor market). If these things are done, more families may decide that schooling is a viable option as opposed to "child labor" for their children.

Child labor is a widespread, growing problem in the developing world. About 250 million of the world's children work, nearly half of them full-time. Child labor (regular participation in the labor force to earn a living or supplement household income) prevents children from participating in school.

One constraint on Ghana"s economic growth has been inadequate human capital development. According to 1992 data for Ghana, one girl in three and one boy in four does not attend school. The figures are worse in rural areas.

Canagarajah and Coulombe studied the dynamics of how households decided whether to send children 7 through 14 to school or to work, using household survey data for 1987Ð92. They do not address the issue of street kids, which does not imply that they are less important than the others.

Unlike child labor in Asia, most child labor in Africa, especially Ghana, is unpaid work in family agricultural enterprises. Of the 28 percent of children engaged in child labor, more than two-thirds were also going to school. Of all children between 7 and 14, about 90 percent helped with household chores.

Boys and girls tend to do different types of work. Girls do more household chores while boys work in the labor force.

The data do not convincingly show, as most literature claims, that poverty is the main cause of child labor. But poverty is significantly correlated with the decision to send children to school, and there is a significant negative relationship between going to school and working. Increased demand for schooling is the most effective way to reduce child labor and ensure that Ghana's human capital is stabilized.

The high cost of schooling and the poor quality and irrelevance of education has also pushed many children into work.

And family characteristics play a big role in the child"s decision to work or go to school. The father's education has a significant negative effect on child labor; the effect is stronger on girls than on boys. So adult literacy could indirectly reduce the amount of child labor.

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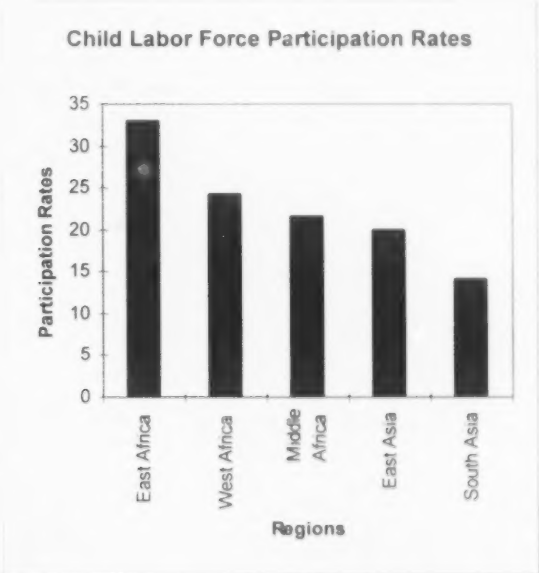
Abstract

This paper analyzes the determinants of child labor in conjunction with decision to school of Ghanaian children between the ages of 7 through 14 using national household surveys conducted between 1987-92. The paper briefly reviews some of the salient literature on child labor, especially those relevant to the phenomena in Africa, and presents tabular and multivariate analysis of the data. Unlike Asia, the majority of child labor in Africa, and especially in Ghana, is unpaid work and takes place in family agricultural enterprises. Of the 28 percent of children involved in child labor more than two-thirds were also simultaneously schooling. Of all the children between 7-14 years around 90 percent were involved in household chores. The paper does not address the issue of street kids which does not imply they are less important. The paper shows there are some clear gender based distinctions in the type of tasks performed by a girl and boy worker; girls do more household chores, while boys are in labor force. Our data does not convincingly show, as most literature claim, that poverty is the main culprit of child labor; however, poverty is significantly correlated with decision to school. Using bivariate probit models with varying specifications and variables the paper clearly shows that there is a significant negative relationship between going to school and working; increasing schooling demand is the effective way of reducing child labor and ensure that Ghana's human capital is stabilized. The high cost of schooling and the low quality and weak relevance of education has also pushed many children into work. Family characteristics have a big role to play in child's decision to school or work. Fathers' education has a significant negative effect on child labor; the effect is stronger for girls than boys. Given that child labor is least researched in Africa, this paper provides a comprehensive analysis of child labor in Ghana in the African context.

1. Introduction

Child labor is a widespread and growing phenomena in the developing world. ILO (1996a) estimates put the prevalence of child labor as 250 million in the World, out of which 61 percent is in Asia, 32 percent in Africa and 7 percent in Latin America. The same source also indicates that 120 million children are full time workers and 80 percent of them are between 10-14 years of age. In terms of child labor force participation rates Africa ranks highest with 33 percent in East Africa, 24 percent in West Africa and 22 percent in middle Africa, followed by East Asia and South Asia with 20 and 14 percent respectively (see Figure 1 below). The above information indicates the intensity of child labor and the necessity to address it, in order to eliminate its adverse effects on human capital development and the future growth potential of developing countries.

Figure 1: Child Labor Force Participation Rates in the developing countries



The literature distinguishes *child labor* and *child work*, where the latter is the more unharmful and probably healthy kind, and includes helping household in various chores and household activity.

These activities may take place after school hours or during holidays more intensively and are probably inevitable in rural areas. ILO's Minimum Age convention authorizes the employment of children above 12 or 13 years in certain type of light work under certain conditions (ILO, 1995). On the other hand, Child Labor is defined as the participation of school-aged children on a regular basis in the labor force in order to earn a living for themselves or to supplement household income. Child labor, therefore, prevents school participation and also possibly exposes them to health hazards. Empirical studies reveal that children contribute as high as one third of household income at times and their income source can not be treated as insignificant by poor families (Patrinos and Psacharopoulos, 1995).

One of the major constraints in Ghana's growth challenge has been the lack of human capital development. The enrollments rates have not been picking up fast and the future trend on human capital does not look optimistic. The non-school attendance rates in Ghana are very high with wide gender disparities. 1992 GLSS data indicate that one in every three girls and one in every 4 boys does not attend school. The rural non-schooling is higher, with 37 percent for girls and 28 percent for boys. *Ghana 2000* in its strategy for accelerated growth in Ghana argued for massive investment in primary education as a way of building the necessary human capital for sustainable growth (World Bank, 1993). In this context, it is important to understand the dynamics of household decision making of whether to send children to school and/or work, to benefit from investments in education. If not, colossal public investments in education are not likely to get children into class rooms.

It has been noted that inconsistency between minimum age for employment and schooling in most countries makes the implementation of these laws complicated (ILO, 1996). This seems to be the case for Ghana as well. Ghana's labor Decree (1967) prohibits employment of children under the age of 15, although the law permits undefined "light" work by children. The Education Act (1961) states that education is free and compulsory, although it does not define until what age the child should be in school. This indicates the problems of addressing child labor through legislation alone.

This paper tries to investigate the child labor phenomena in Ghana in conjunction with school participation trends. In addition to citing examples from literature, this paper uses three rounds of the Ghana Living Standards Survey and analyses the issue of child labor at the household level where it takes place. The study does not focus on child labor away from home, i.e. street kids and prostitution. Also the definition used for child labor force participation used in this paper excludes household chores such as fetching wood, fetching water, cooking, cleaning and child care and similar activities undertaken by a boy or girl child in the household. However, household chores are accounted for separately. This paper addresses an aspect of labor markets which has not been discussed in Ghana in any detail in the past literature.

The next section describes the data sources, while the following section gives a description of tabulations on child labor and school participation trends in Ghana based on the data available. Section 4 presents the econometric model used in this paper to analyze the joint probability and trade-off of child labor and schooling in Ghana. Section 5 discusses the results of the econometric model and where relevant showing evidence of similar findings from other studies. The final section concludes with some policy lessons for eliminating child labor and ensuring higher participation in schooling which is essential for Ghana's growth challenge.

2. Data

It has been noted that there is very limited information on child labor in the developing countries mainly because none of the employment and labor surveys capture child labor (Grootaert and Kanbur, 1995). However, in Ghana we do have information.[1] The two main sources of data in our analysis are Ghana Living Standards Survey (GLSS) 1987/88, 1988/89, and 1991/92 and ILO Child Labor Survey (1996b). The latter was collected in a small sample of children who did not attend school in Accra and two rural areas. Since the sample is non-random and also not nationwide it is not wise to draw nationwide conclusions or policy recommendation. This data set does not enable us to analyze simultaneously the decision of schooling and child labor. The GLSS

[1] See Canagarajah and Thomas (1997) and Coulombe and McKay (1995) for a detailed description of the GLSS data.

data sets which are mainly collected to understand poverty and welfare levels also contain information on all types of household behavior including child participation in the labor market. One interesting aspect of the GLSS data sets is that they have information on children's activity in the last seven days, especially whether they went to school, worked in the labor market or worked at home in household chores. Thus the information enables us to divide the child activity into four group - work only, school only, work and school and none. The information is available for all individuals age 7 and above. The sample sizes and their categorizations are given in Table 1 below. As we can see the sample although covers on average more than 3000 households per round and more than 15000 individuals, it has only around 3000-5000 children per survey round. Since the questions are asked about schooling and work in the last seven days we use only those who were not on school holidays in order to minimize selection bias in our child labor sample. This gives us a final child sample of 2876 for GLSS1, 3011 for GLSS2, and 3859 for GLSS3. In each of the periods more than 60 percent of the children in the sample come from rural areas.

Table 1: Sample Sizes of GLSS

	GLSS 1 (1987/88)	GLSS 2 (1988/89)	GLSS 3 (1991/92)
Number of households	3172	3434	4523
Number of individuals	15 227	15 369	20 403
Number aged 7-14	3357	3421	4717
Number not constraint by school holidays	2876	3011	3859
Number in rural areas	1838	2056	2601

Source: GLSS1-3.

As we have already noted the GLSS data captures majority of child labor age group and can be treated as a reliable basis for child labor analysis. The fact that the data set was selected to analyze household welfare does not bias the sample and makes the data sets more interesting. The wide set of information on household welfare also enables us to test the hypothesis whether poverty is the main determinant of child labor among other things. The schooling information on children enables us to jointly exploit their linkage to understand their trade-off for a child. It is also worth noting since most children are not working due to personal convictions, their analysis in a household framework is necessary for meaningful policy analysis. Also the claim that education system is not responsive and relevant for labor markets necessitates us to analyze the two choices simultaneously, rather than separately as many studies in the past have treated.

3. Child Labor and Schooling: Tabulation Results

It is estimated, based on GLSS 1992 survey, that around 28 percent of children between the ages 7-14 years were involved in child labor in Ghana. This nationally amounts to around 800,000 children in child labor. However, over the three rounds child labor rates changed from 30.5 in 1987 to 22.4 in 1988 and 28 in 1992, which corresponds to the trend in the agricultural income between 1987-92. In 1992 out of the total number of children who were working 66 percent were also going to school and 90 percent were involved in household chores. 20 percent of boys and 17 percent of girls were observed to do both - working and going to school. The main difference was in those who did nothing; 14 percent of boys and 22 percent of girls did nothing. Male labor force participation for 7-14 year age group is 33.4 compared to 27.6 for girls, although if domestic chores were to be included the participation rates will change to 88 for girls and 75 for boys. These trends are similar to what has been observed in other developing countries where data is available (ILO, 1996).

On the other hand school participation rates have evolved over time with 58.6 percent in 1987, 68.0 in 1988 and 72.7 in 1992. The girls' school participation increased from 53 to 68 percent, while that of boys increased from 64 to 76 percent between 1987-92. Urban schooling participation rates for the 7-14 year age group has increased from 68 to 83 percent while rural rates increased from 53 to 67. All this indicate the positive trend in school participation rates, despite the existence of child labor. However, these figures do not give any comfort as more than one quarter of children in the school age population are not attending school.

In terms of total labor force participation (LFP), children constitute 12.1 percent of the labor force. Out of the total labor force in rural areas 14.4 percent and 4.4 percent in urban areas are child workers. However, in terms of total number of labor hours children in the 7-14 year age group contribute 5.3 percent with those above 65 years contributing 5.5 percent. Of the total male LFP 14 percent is from those below 15 years, while the corresponding figure for females is 10 percent. All these data indicate the magnitude of child labor in Ghana. If household chores

were to be included, as noted in the literature (ILO, 1996), girls will easily outnumber the boys in LFP.

A child begins to work as early as five years in rural Ghana, although the current data source only gives labor participation information for those above 7 years of age. The average age of child labor for a boy is almost twelve while for a girl it is around 11, indicating that girls start working early. Girls also work more hours than boys and this difference is more pronounced if we take hours spent on household chores. Table 2 presents a typical profile of a boy and girl child worker in Ghana. As can be seen from the table more than 90 percent of child labor is in rural areas. It is also clear that these children work as many hours as adults. More than 5 percent of total labor hours nationally is contributed by children, signifying the importance of child labor in the national economy.

Table 2: Typical Profile of a Child Worker in Ghana

Category	Male	Female
Average Age: Urban	11.8	11.3
Rural	11.0	11.0
Child worker Composition: Urban	4.5	5.2
Rural	49.1	41.2
Average hours in labor market per week	13.5	15.1
Average hours in household chores per week	13.3	17.1
Proportion of child workers in labor force	14	10
Proportion in total work hours	15.8	24.7
Child labor force participation rate	29.3	26.7
Participation in Trading (percentage)	1.3	6.4
Participation in Farming (percentage)	96.3	88.5
School Participation (percentage)	76.7	68.3
Contribution to total hours of participation nationally	5.4	5.3

Source: GLSS 3

One of the claims in the literature that child labor increases with high levels of welfare is not convincingly proved in our analysis. Tables 3 below shows that that there is no clear direction in this relationship whether we analyze by regional patterns of poverty or welfare quintiles of households. Poverty incidence and depth in rural Savannah and rural forest is highest but child

labor in rural forest is not high. Incidence and depth of poverty in rural coastal areas are lower than rural forest, yet the incidence of child labor is not lower than rural forest. From all this, it is clear that school participation is highly correlated with household welfare, indicating that households are willing to send their children to school as long as they have enough resources to do so. Child labor probably exist as long as the threat of poverty lingers in the household, pushing households who are above the poverty line also to send children to work. In poor households[2] 7.3 percent and in non-poor households 8.6 percent of the children were working, while the corresponding figures for schooling were 54.2 and 56.7 percent. As we will see later from our econometric analysis household welfare is indeed weakly related to the incidence of child labor and strongly related to school participation trends.

Table 3: Poverty and Child labor in Ghana 1992

	HEADCOUNT RATIO		POVERTY-GAP RATIO		CHILD LABOR INDICATORS			
REGION	Index	Contribution	Index	Contribution	Work Only	School Only	Work & School	None
Accra	23.0	6.0	5.6	5.7	3.1	86.3	0.8	9.8
Other Urban	27.7	22.0	7.1	22.0	3.5	75.7	6.0	14.7
Rural Coastal	28.6	12.9	6.8	11.2	12.1	48.6	24.2	15.1
Rural Forest	33.0	31.1	8.3	30.4	6.9	47.5	36.9	8.7
Rural Savannah	38.3	28.1	10.5	30.3	18.0	33.2	13.2	35.6

Source: GLSS3

Since survey data was not available to analyze child labor and schooling simultaneously most past studies have assumed child labor and schooling as mutually exclusive categories. However, since GLSS data provides information on both we find that almost 19 percent of the children were both working and schooling. Although there is no doubt that this would have had an impact on their educational attainment, it clearly indicates that it is indeed possible in many cases

Table 4: Joint Labour Force and School Participation Rate (last 7 days), by gender, age, ecological zones, expenditure quintiles, socio-economic group and religion - 1991/92

	Work Only	School Only	Work & School	None	All
Gender					
Male	9.2	56.6	20.1	14.1	100.0

[2] Based on the poverty line and number of poor people as defined in Ghana Statistical Service (1995).

Female	9.4	51.0	17.3	22.3	100.0
Age					
7	4.7	56.2	7.4	31.7	100.0
8	6.7	59.1	11.4	22.8	100.0
9	6.1	57.5	17.0	19.4	100.0
10	8.8	55.2	20.2	15.9	100.0
11	8.2	56.3	23.6	11.9	100.0
12	11.5	51.3	22.6	14.6	100.0
13	14.0	46.1	28.3	11.6	100.0
14	16.4	47.1	24.3	12.2	100.0
Expenditure Quintile					
Lowest	13.1	46.4	15.5	24.9	100.0
Second	6.8	54.1	21.7	17.3	100.0
Third	10.5	53.8	18.6	17.1	100.0
Fourth	8.7	55.2	19.2	17.0	100.0
Highest	5.7	64.6	19.1	10.6	100.0
Socio-Economic Group					
Public	2.8	71.1	13.5	12.5	100.0
Wage-priv-formal	1.3	75.5	13.9	9.3	100.0
Wage-priv-informal	15.2	52.5	18.2	14.1	100.0
Self-agro-export	9.3	45.2	36.3	9.3	100.0
Self-agro-crop	15.3	35.4	24.7	24.7	100.0
Self-bus	3.4	74.2	9.0	13.3	100.0
Non-working	2.2	68.9	0.0	28.9	100.0
Religion					
Muslim	12.4	49.7	12.8	25.1	100.0
Catholic	6.1	59.9	21.7	12.2	100.0
Protestant	4.8	62.1	25.6	7.5	100.0
Other Christian	5.5	66.0	19.5	9.1	100.0
Animist	16.6	32.6	16.2	34.6	100.0
All	9.3	53.9	18.8	18.1	100.0

Source: Authors' calculations from the GLSS 3.

Table 5: Occupation Distribution, by region and gender, (1991/92)

	Urban	Rural	Male	Female	All
Farming	59.2	96.3	96.3	88.5	92.7
Trade	22.3	1.7	1.4	6.3	3.7
Processing	11.7	0.7	0.5	3.3	1.8
Other	6.8	1.3	1.8	1.8	1.8
All	100.0	100.0	100.0	100.0	100.0
# of obs.	103	954	567	490	1057

Source: GLSS 3.

to have these activities coexisting. One interesting observation from Table 3 is that work and school combination is a predominantly a rural phenomenon and very marginal in Accra and other urban areas.

Table 4 presents the child labor and schooling participation pattern of children in Ghana in 1992 by various disaggregations. It is useful to note that with increasing age child labor plays an increasing role in communities. In terms of welfare quintiles the child labor pattern is not conclusive, but schooling shows a steady increase with higher levels of welfare. When considering socio-economic group of parents it was noted that the children of private informal sector wage earners and food crop producing farmers had the highest incidence of child labor. Religion plays an important role in explaining child labor and schooling patterns of children. Children from Christian households are more enrolled in school followed by Muslims and animists, while the child labor pattern in relation to religion is the reverse of the schooling trend.

Majority of children are unpaid family workers, involved in family farm and enterprises (see Table 5). It is worth noting that more than 90 percent of the children were involved in household level agricultural activities. This is more the norm than exception in all Sub-Saharan African (SSA) countries; in South Asian countries child labor is predominantly in the manufacturing sector. In SSA only 3 percent of the children are wage workers, the majority of whom are in urban areas and boys (Ashagrie, 1993; ILO, 1996).

Wage differentials between children and adults have been discussed extensively in the literature. It is clear that on average, in Ghana, children earn one sixth of what adults earn. The minimum wage is 12,000 cedis, while only a meager 10 percent of child workers receive any where near that amount. With such low wages it is no surprise why employers prefer children to do most of the work where possible. In family enterprises the ease and flexibility of household child labor makes it attractive to employ children in a variety of tasks. The table below shows the sectoral pattern of child labor and its predominance in farming activities, although there are more girls involved in trading and processing compared to boys.

The Participatory Poverty Assessment (Nortan et al, 1995) found that parents did not want to send their children to school due to inferior quality of teaching and teacher absenteeism. It was also noted that some teachers wanted the children to work in their farms in return for classes for them. This practice has disgusted many parents with Ghana's schooling system and has pushed them into involving their children in their own farms instead of teachers' farms. The high

opportunity cost of sending children to school has also been stated as a reason for not sending them to school by many rural households.

Table 6: Schooling expenditure per student, public school only, by urban/rural, level and items, 1991/92 *(in Cedis, based on students currently enrolled)*

	Urban		Rural		Total	
	Mean	Median	Mean	Median	Mean	Median
Primary 1-2						
Fees	3091	1450	762	550	1465	650
Uniforms	2280	2000	1508	1500	1741	1500
Books	866	400	337	200	497	200
Total	11082	7650	4838	3350	6681	4050
Primary 3-6						
Fees	2505	1500	957	800	1484	850
Uniforms	2581	2425	1870	1800	2111	2000
Books	1480	900	752	500	999	600
Total	13360	9450	5968	4350	8408	5390

Sources: Authors' calculations from the GLSS 3.

Note: The horizontal totals refer to the above three items as well as expenditure on parent/teacher associations, transportation, food and other expenses in cash or in-kind.

Regardless of the rhetoric that education is free, many parents have had to pay some amount for tuition and other direct costs in terms of uniform and books. This together with recent efforts of cost-recovery schemes have pushed parents in pulling their children out of school and sending them to work. As the table below very clearly shows education is not free. This has pushed more and more parents to stop their children from school as they just can not afford it. For instance, in 1992 per capita costs for publicly provided primary education has been in the range of 7,300 cedis which accounts for more than 15 percent of households mean per capita expenditure, thus indicating the burden of school expenses on poor households. Also past studies (Demery et al, 1995) have found that the public subsidies benefit the urban non-poor more than the rural poor. This emphasizes the point that the poor do not benefit from government resources towards their human capital investments.

The ever changing nature of labor markets and low returns to education have made education less attractive for many parents. This has especially been the case in rural areas, where formal

education makes very little difference given limited formal sector opportunities and most skills are acquired by the "learning by doing" principle. Child labor is perceived as a process of socialization in many countries and it is believed that working rather than education enables a child to get acquainted with the skills required for being employable (Grootaert and Kanbur, 1995).

4. The Econometric Model

Our model tries to understand the factors that influence the probability of child's school attendance and working behavior in a reduced form model, focusing on a mixture of demand and supply side variables. The particular choice of the estimation method has been influenced by the decision making process, and available data. We do not want to assume that schooling and work decisions of children are independent, which could be treated in a multi-nomial logit model. We also do not want to assume any sequential process in the decision making process as we believe it is not necessarily a sequential choice. Hence we treat schooling and working possibilities as two interdependent choices.

There are no studies yet which have used the dichotomic model for labor and education jointly due to unavailability of data. With a view to exploiting the rich information on joint participation in schooling and working of children in Ghana (GLSS), we use a bivariate probit model to test the likelihood of children working and going to school; given varied individual and household characteristics. Bivariate probit models allow for the existence of possible correlated disturbances between two probit equations. It also allows us to test whether this joint estimation makes significant difference as opposed to estimating univariate probits for each decision.

In the Bivariate probit, let the latent variable y_1^* represent the decision of working and y_2^* represent the decision of schooling. Therefore the general specification for a two-equation model would be

$y_1^* = \beta_1 + \varepsilon_1$, $y_1 = 1$ if $y_1^* > 0$, 0 otherwise

$y_2^* = \beta_2 + \varepsilon_2$, $y_2 = 1$ if $y_2^* > 0$, 0 otherwise,

$E[\varepsilon_1] = E[\varepsilon_2] = 0$,

$Var[\varepsilon_1] = Var[\varepsilon_2] = 1$,

$Cov[\varepsilon_1, \varepsilon_2] = \rho$.

and the likelihood function to maximise is

$$L = \prod \int_{-\infty}^{\beta_1 X_1} \int_{-\infty}^{\beta_2 X_2} \phi_2(z_1, z_2; \rho) dz_2 dz_1$$

where ϕ_2, the Bivariate normal density function, is

$$\phi_2(z_1, z_2; \rho) = [2\pi(1-\rho^2)^{1/2}]^{-1} \exp[-1/2(1-\rho^2)^{-1}(z_1^2 + z_2^2 - 2\rho z_1 z_2)]$$

and,

ρ - coefficient of correlation between the two equations.

X_1 and X_2 - row vectors of exogenous variables which determine respectively, working and schooling propensities.

β_1 and β_2 - associated parameter column vectors.

The coefficients need to be adjusted to be marginal effects, unlike standard linear regression models. In this probit model $E[y] = \Phi(\beta' x)$, then the marginal effects are $\frac{\partial \Phi(\beta' x)}{\partial x_i} = \phi(\beta' x)\beta$. These marginal effects would obviously vary with the values of $\mathbf{x}$. It is worth noting that all the coefficients β would have the same scale factor $\phi(\beta' x)$ applied. Except for dichotomous variables these marginal effects would be correct for infinitesimal changes in explanatory variables. In case of dichotomous variables it is better to estimate the equation with and without the variable of interest. For instance, the marginal effect for the dummy variable i, (δ_i), would be defined as $\delta_i = \Phi(\beta_{-i}\bar{x}_{-i} + \beta_i) - \Phi(\beta_{-i}\bar{x}_{-i})$ where the subscript $-i$ represent all the variables but the i^{th}, and $\bar{x}_{-i}$ are their sample means.

5. Econometric Results

In the bivariate probit model there are two dependent variables. The first dependent variable is defined 1 if the child went to school in the last seven days, and 0 if otherwise. The second dependent variable is defined as 1 if the child is economically active in the labour market the last 7 days and 0 if otherwise.

Annex Table 1 presents the definition and Annex Table 2 presents some descriptive statistics of the explanatory variables used in the analysis.

The child's age and gender which revealed differences in child labour and schooling participation was included as child specific variables in the regressions. Since we also noted earlier that household characteristics are important, we included some parental and household wide characteristic variables. Parent specific variables are the education of the father and mother taken separately and variables accounting for their presence in the household. For household characteristics variables other than general household welfare, we included information on siblings, the household's main socio-economic category, religious background, and asset ownership. We also included regional dummies to take care of the demand patterns of labour markets, schooling distance and expenditure as supply variables. We felt these variables are bound to have an impact on the pattern and intensity of child labour and school attendance.

We use two different estimations for each sub-sample estimation of the model. The second is similar to the first except that it includes school supply variables, to test the relevance of schooling supply in the household decision to send children to school or to work. Apart from estimating the model at the national level, we also estimated regional, gender, and age-group sub-samples to test the robustness of estimates.

Table 7: Determinants of Labour Force Participation and School Participation, Ghana, Children Aged 7-14

	Model 1				Model 2			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-8.3280	*-2.944*	-2.1243	*-8.127*	-8.0076	*-2.837*	-2.3329	*-8.305*
Agey	0.1551	*4.430*	0.1883	*5.584*	0.1539	*4.372*	0.1931	*5.486*
Agey2	-0.0052	*-3.134*	-0.0089	*-5.518*	-0.0051	*-3.086*	-0.0091	*-5.440*
Male	0.0146	*0.986*	0.1136	*7.620*	0.0131	*0.886*	0.1131	*7.220*
Relson	-0.0469	*-1.406*	0.0006	*0.018*	-0.0463	*-1.392*	0.0106	*0.316*
MotherIn	0.0396	*1.598*	-0.0111	*-0.445*	0.0395	*1.588*	-0.0179	*-0.678*
FatherIn	-0.0877	*-3.014*	0.0915	*3.367*	-0.0877	*-3.018*	0.0964	*3.438*
Med1	-0.0114	*-0.449*	0.0977	*3.437*	-0.0149	*-0.587*	0.0858	*2.880*
Med2	-0.0194	*-0.846*	0.1528	*5.714*	-0.0216	*-0.943*	0.1450	*5.251*
Med3	0.0002	*0.003*	0.0627	*1.050*	-0.0006	*-0.009*	0.0537	*0.894*
Fed1	-0.0174	*-0.622*	0.1158	*3.721*	-0.0239	*-0.842*	0.1170	*3.537*
Fed2	-0.0228	*-1.185*	0.1160	*5.598*	-0.0291	*-1.504*	0.1065	*4.962*
Fed3	-0.1119	*-3.303*	0.1661	*4.772*	-0.1186	*-3.488*	0.1556	*4.362*
Lnpcwell	1.1839	*2.516*	0.0863	*5.569*	1.1066	*2.354*	0.0843	*5.112*
Lnpcwell2	-0.0494	*-2.521*	-	-	-0.0464	*-2.373*	-	-
Child06	-0.0009	*-0.132*	-0.0089	*-1.301*	-0.0009	*-0.129*	-0.0082	*-1.156*
Bro714	0.0080	*0.772*	0.0154	*1.506*	0.0079	*0.752*	0.0135	*1.276*
Sis714	-0.0129	*-1.130*	0.0315	*2.609*	-0.0137	*-1.195*	0.0361	*2.842*
Male1559	0.0195	*2.553*	-0.0151	*-1.955*	0.0198	*2.594*	-0.0141	*-1.747*
Fem1559	0.0033	*0.420*	0.0070	*0.848*	0.0017	*0.213*	0.0046	*0.529*
Old60	0.0161	*1.188*	-0.0261	*-1.955*	0.0136	*0.995*	-0.0335	*-2.390*
Selfagro	0.1104	*4.968*	-0.0304	*-1.319*	0.1165	*5.165*	-0.0266	*-1.078*
Selfbus	-0.0903	*-3.328*	0.0467	*1.833*	-0.0882	*-3.229*	0.0486	*1.841*
Mheadeco	0.0229	*0.904*	-0.0579	*-2.503*	0.0289	*1.135*	-0.0447	*-1.885*
Muslim	0.0162	*0.684*	0.0742	*3.279*	0,0072	*0.301*	0.0511	*2.166*
Catho	0.0003	*0.010*	0.1505	*5.687*	-0.0062	*-0.254*	0.1373	*4.969*
Protes	0.0430	*1.749*	0.1957	*7.569*	0.0348	*1.409*	0.1815	*6.781*
Ochris	-0.0207	*-0.937*	0.1315	*5.610*	-0.0286	*-1.283*	0.1211	*4.992*
Landsize	-0.00004	*-0.351*	0.00004	*0.300*	-0.00003	*-0.231*	0.00007	*0.511*
Animal	0.0016	*0.653*	-0.0116	*-6.726*	0.0021	*0.847*	-0.0111	*-6.130*
Accra	-0.2646	*-5.325*	0.1374	*3.223*	-0.2984	*-5.666*	0.0798	*1.646*
Town	-0.1668	*-6.575*	0.1084	*4.267*	-0.1829	*-6.691*	0.0750	*2.543*
Rcoastal	0.1098	*4.239*	0.0704	*2.752*	0.0891	*3.237*	0.0214	*0.760*
Rforest	0.1320	*6.409*	0.2026	*8.832*	0.1218	*5.822*	0.1829	*7.439*
Tschexp	-	-	-	-	0.0260	*1.946*	0.0345	*2.490*
Distance	-	-	-	-	-0.0007	*-2.722*	-0.0012	*-5.277*
Smiss2	-	-	-	-	0.1416	*1.184*	-0.5117	*-3.416*
ρ	-0.1252	*-3.540*			-0.1527	*-4.165*		
lnL	-3513.7				-3432.0			
lnL(=0)	-4500.5				-4500.5			
Sample Size	3811				3811			

The results we obtained from the econometric model are in line with past research done on child labour and schooling determinants as independent choices, except for a few differences in the intensities of these effects. In terms of gender we find that there is no significant difference between boys and girls in their likelihood to work. This is mainly because our definition of work did not include household chores where majority of the girls are active. In terms of labour force participation this finding however may be at conflict with earlier findings, Psacharopoulos and Arrigada (1989) and Patrinos and Psacharopoulos (1995), indicated that males were more likely to be involved in the labour market. When the definition was expanded to include household chores it clearly showed that girls are more likely to participate in the more broadly defined labour market activities than boys. The gender discrimination in schooling comes out very clearly in the schooling equation where the male dummy had a higher probability of school attendance compared to girls.

In literature it is often claimed that the main determinant of child labour is poverty (Grootaert and Kanbur, 1995). Hence we included a welfare index which was household per capita expenditure deflated by time and spatial price index. Although a negative relationship was expected in the labour force equation we found an inverted U shape relationship, which peaked at 152,000 cedis and is slightly below the median expenditure (figure 2). This relationship was observed to be very strong in rural areas. It may be due to the prevalence of slack season labour demand patterns in regions where the poor live, or the presence of constraints in terms of other inputs and availability of credit which distort this postulated relationship. However, the significant low effect of welfare on the probability of labour force participation has also been found by Levinson (1991). This casts doubts on the traditional, simplistic view that poverty pushes children into the labour market.

However, in terms of school participation the effect of welfare of the household is rather strong and positive. The difference in school participation between the lowest and top deciles is around 12 percentage points. The above relationship is strong everywhere except in the presence of livestock in the household when the relationship between schooling and work is not different between poor and non-poor households, partly because livestock is a time-intensive activity.

Our estimations also show that fathers with very high levels of education are likely to have a negative effect on the likelihood of working, while mothers' education seems to influence only schooling participation. The latter may be at odds with other empirical studies where the income variables used

might not have been as good as ours and thus the parent's education variable would have captured more of the permanent income effect. In general parents education has a strong positive effect on schooling participation than working. The presence of the father at home is likely to positively effect the likelihood of going to school as opposed to work, which is similar to Tienda (1979).

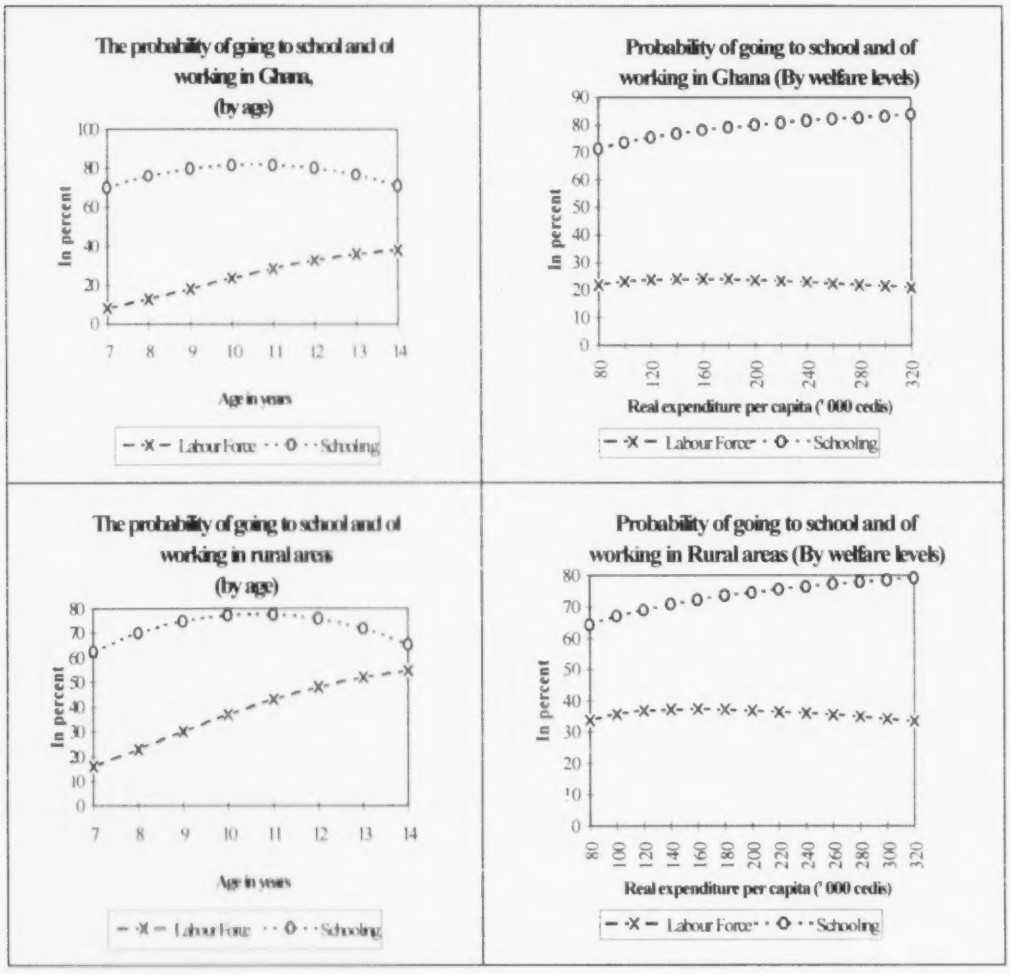
As figure 2 below shows the probability of going to school and of working based on age coefficients shows that there is steep increase in labour force participation in rural areas. It is also possible that this result is due to inadequacy of schooling system. The probability of going to school increases with age until 11 years and then starts declining. This is consistent with the high prevalence of delayed school attendance in Ghana (Glewwe and Jacoby, 1993).

It has been argued in the past that the age, presence and gender of siblings has a strong effect on schooling and working patterns of members of households (Chernichovsky, 1985). We included a series of variables to capture this effect - namely number of siblings in 0-6 and 7-14 age groups and their gender, number of female and male adults. The only significant variable turns out to be the presence of adult males in the household, whereby each additional male decreases the probability of working by approximately 2 percent. On the other hand in the schooling equation, there is a positive marginal effect on school participation, if there are other female siblings or elderly people in the household. This is because if other members are able to take care of household chores, then school aged children are liberated from household chores, which are likely to prevent them from going to school. The literature also indicates that in large households parents in general can not afford to send all children to school and hence some children attend school at the expense of others (Lloyd and Gage-Brandon, 1994).

In terms of employment activity of parents we find that if parents are involved in agricultural self-employment then children in such households are 12 percent more likely to work than children from other type of households. On the other hand children from non-farming self-employment households are less likely to work. The headship of household was found to affect schooling more than labor force participation. It was observed that children from female headed household are 4 percent more likely to go to school rather than male headed households, which is consistent with

past research which indicates that female headed households were more rational in intra-household resource allocation pattern and investing on essential items (Haddad et al, 1996).

Figure 2: The probability of going to school and working by age and welfare levels.


The probability of going to school and of working in Ghana, (by age)
In percent
Age in years
Labour Force
Schooling
Probability of going to school and of working in Ghana (By welfare levels)
In percent
Real expenditure per capita ('000 cedis)
Labour Force
Schooling
The probability of going to school and of working in rural areas (by age)
In percent
Age in years
Labour Force
Schooling
Probability of going to school and of working in Rural areas (By welfare levels)
In percent
Real expenditure per capita ('000 cedis)
Labour Force
Schooling

Religious dummies did not matter in case of child labor force participation. However, in the schooling equation all religious group dummies were significantly different from the reference group. In relation to Animist (the reference group,) Protestants were 18 percent more likely,

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Catholics 13 percent and Muslims 5 percent more likely to send their children to school. This clearly reveals that religious groups have a significant influence not only on the values of education in societies but also on the facilities they make available through free or subsidized education facilities, which provides the incentive for parents to send children to school. In Ghana many good primary school are run by Churches or Church organizations and they definitely have a key role in school participation behavior.

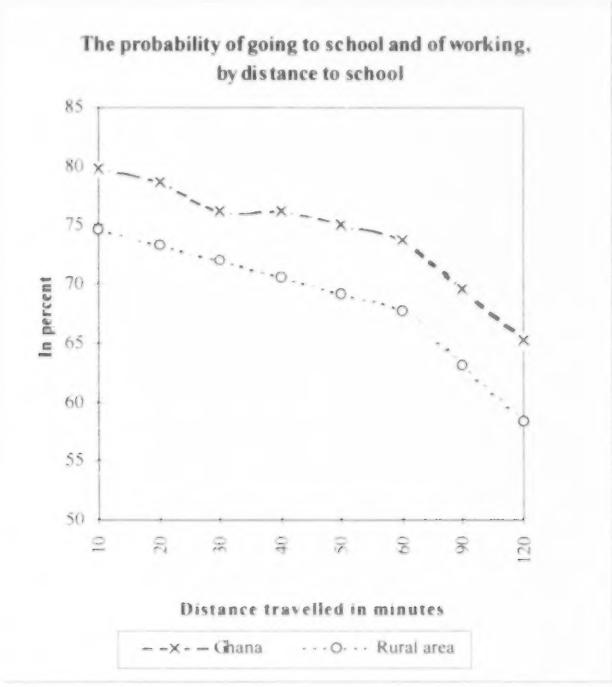
Regional dummies which were included in the schooling and labor force equations showed coefficients which were significantly different from zero in reference to the base region, rural-Savannah. In the labor force equation the two urban dummies had lower rates and the two rural areas had higher rates of participation than rural- Savannah. this can be explained by the agricultural opportunities being limited and weather dependent in rural Savannah as opposed to other rural areas, where there is more potential for employment year round in farming and non-farming activities. This was also observed in our descriptive data tabulations whereby a large number of children were observed to be idling in this region.

However, in terms of school attendance the regional dummies are positive and significantly different from the reference group, rural-Savannah. Rural- Savannah has been observed to have fewer good quality schools and mostly the schools available are not densely distributed. Even after controlling for latter by a distance variable we find that the effect is significant which indicates that schools are not of acceptable quality which operates as a disincentive in this region. The distance to school, however, had significant negative strong effect on probability of going to school as would be expected.

The schooling expenditure variable was included to identify the budget constraint on the household as a deterrent on school participation. We observe that with high fees there is higher school participation. It may be recalled that in Ghana, although public schools are meant to be free they charge indirect fees from parents which has been a disincentive for parents to send children to school. The current effect is mainly coming from private schools in Accra who provide

good quality education for a official fee. This latter effect has been also observed in Demery et al (1995) which showed that Accra had high private primary and secondary school attendance.

Figure 3: Probability of schooling and working by distance to school



In terms of labor force participation as one would expect schooling expenditure has a significant deterrent effect. The high costs of schooling increases the probability of working. This is because as children find that they can not afford school they are pushed into working in order to enable them to attend school or, it may just completely prevent them from going to school and participate in household enterprises.

The results in Table 7 are based on the total sample, combining all regions, genders, and age groups together. In order to see whether these findings are robust and whether there are any nuances to the observations made, we estimate the models in different sub-samples. The models were estimated as urban-rural, and male-female sub-groups (Tables 8-11). Annex Tables A3-A5

estimate the same relationship in terms of 7-10 year olds and 11-14 year olds samples and with the inclusion of household chores. The sub-sample estimates confirm the overall results for robustness of the estimates, although some additional differences could be observed.

Table 8: Determinants of Labour Force Participation and School Participation, Urban Areas, Children Aged 7-14

	Model 1				Model 2			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-0.3555	*-0.132*	-1.3422	*-3.817*	-0.0142	*-0.005*	-1.5146	*-4.109*
Agey	0.0651	*1.910*	0.1193	*2.655*	0.0628	*1.784*	0.1242	*2.745*
Agey2	-0.0023	*-1.507*	-0.0058	*-2.707*	-0.0023	*-1.416*	-0.0060	*-2.774*
Male	-0.0182	*-1.135*	0.1002	*4.758*	-0.0188	*-1.131*	0.1027	*4.835*
Relson	-0.0088	*-0.287*	0.0810	*1.716*	-0.0068	*-0.218*	0.0793	*1.673*
MotherIn	0.0179	*0.725*	0.0086	*0.214*	0.0136	*0.539*	0.0133	*0.329*
FatherIn	-0.0334	*-1.283*	0.0257	*0.808*	-0.0327	*-1.242*	0.0229	*0.709*
Med1	-0.0103	*-0.440*	0.0917	*2.244*	-0.0071	*-0.311*	0.0880	*2.165*
Med2	-0.0022	*-0.114*	0.0820	*2.536*	-0.0019	*-0.101*	0.0814	*2.525*
Med3	0.0049	*0.145*	0.0456	*0.857*	0.0045	*0.128*	0.0454	*0.846*
Fed1	-0.0115	*-0.405*	0.1127	*2.418*	-0.0056	*-0.196*	0.1064	*2.211*
Fed2	-0.0311	*-1.557*	0.1176	*3.725*	-0.0198	*-0.987*	0.1046	*3.271*
Fed3	-0.0484	*-1.890*	0.1327	*3.138*	-0.0403	*-1.552*	0.1221	*2.829*
Lnpcwell	-0.0165	*-0.037*	0.0521	*2.365*	-0.0431	*-0.096*	0.0394	*1.753*
Lnpcwell2	0.0002	*0.013*	-	-	0.0017	*0.089*	-	-
Child06	-0.0037	*-0.581*	0.0008	*0.082*	-0.0038	*-0.588*	0.0000	*0.005*
Bro714	-0.0018	*-0.209*	0.0206	*1.478*	-0.0012	*-0.139*	0.0203	*1.428*
Sis714	0.0038	*0.373*	-0.0193	*-1.088*	0.0061	*0.597*	-0.0231	*-1.283*
Male1559	0.0019	*0.310*	-0.0166	*-1.833*	0.0028	*0.460*	-0.0175	*-1.868*
Fem1559	0.0066	*1.069*	0.0126	*1.078*	0.0109	*1.602*	0.0060	*0.500*
Old60	0.0218	*1.543*	-0.0154	*-0.683*	0.0253	*1.753*	-0.0228	*-0.992*
Selfagro	0.0827	*4.101*	-0.0274	*-0.810*	0.0706	*3.455*	-0.0089	*-0.259*
Selfbus	0.0007	*0.039*	0.0282	*0.989*	-0.0012	*-0.064*	0.0285	*1.003*
Mheadeco	0.0387	*1.702*	0.0204	*0.720*	0.0379	*1.690*	0.0214	*0.752*
Muslim	-0.0792	*-3.092*	0.0737	*1.999*	-0.0652	*-2.565*	0.0536	*1.424*
Catho	-0.0441	*-1.694*	0.0865	*2.236*	-0.0440	*-1.584*	0.0801	*2.020*
Protes	-0.0467	*-1.907*	0.1101	*2.638*	-0.0392	*-1.591*	0.0981	*2.338*
Ochris	-0.0523	*-2.465*	0.1036	*2.870*	-0.0449	*-2.131*	0.0911	*2.516*
Landsize	-0.0002	*-0.461*	0.0003	*0.630*	-0.0002	*-0.531*	0.0003	*0.773*
Animal	-0.0017	*-0.226*	-0.0097	*-0.927*	-0.0011	*-0.152*	-0.0106	*-0.987*
Accra	-0.0217	*-0.829*	0.0299	*0.959*	-0.0073	*-0.266*	0.0090	*0.274*
Tschexp	-	-	-	-	-0.0266	*-1.876*	0.0361	*2.076*
Distance	-	-	-	-	0.0002	*0.364*	0.0000	*0.084*
ρ	-0.3479	*-3.696*			-0.3080	*-3.041*		
lnL		-735.2				-721.3		
lnL(=0)		-910.6				-910.6		
Sample Size		1233				1233		

Table 9: Determinants of Labour Force Participation and School Participation, Rural Areas, Children Aged 7-14

	Model 1				Model 2			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-13.5930	*-3.522*	-2.5749	*-7.317*	-12.8470	*-3.344*	-2.8092	*-7.346*
Agey	0.1775	*3.693*	0.2335	*5.055*	0.1777	*3.678*	0.2346	*4.807*
Agey2	-0.0056	*-2.486*	-0.0109	*-4.928*	-0.0056	*-2.474*	-0.0110	*-4.702*
Male	0.0343	*1.690*	0.1167	*5.907*	0.0303	*1.489*	0.1140	*5.462*
Relson	-0.0557	*-1.188*	-0.0847	*-1.941*	-0.0506	*-1.080*	-0.0678	*-1.495*
MotherIn	0.0466	*1.369*	-0.0199	*-0.617*	0.0453	*1.322*	-0.0341	*-0.999*
FatherIn	-0.1118	*-2.737*	0.1689	*4.294*	-0.1135	*-2.782*	0.1720	*4.216*
Med1	-0.0106	*-0.296*	0.0946	*2.424*	-0.0204	*-0.569*	0.0784	*1.902*
Med2	-0.0321	*-0.953*	0.2017	*5.087*	-0.0377	*-1.127*	0.1902	*4.634*
Med3	0.0429	*0.339*	0.2273	*1.255*	0.0373	*0.298*	0.1998	*1.113*
Fed1	-0.0364	*-0.944*	0.1219	*3.025*	-0.0444	*-1.125*	0.1247	*2.883*
Fed2	-0.0188	*-0.704*	0.1080	*4.001*	-0.0266	*-0.993*	0.1008	*3.589*
Fed3	-0.1373	*-2.705*	0.1979	*3.691*	-0.1505	*-2.967*	0.1782	*3.237*
Lnpcwell	2.0199	*3.142*	0.1090	*5.279*	1.8337	*2.860*	0.1080	*4.885*
Lnpcwell2	-0.0838	*-3.130*	-	-	-0.0766	*-2.872*	-	-
Child06	0.0032	*0.347*	-0.0104	*-1.098*	0.0033	*0.353*	-0.0088	*-0.897*
Bro714	0.0168	*1.067*	0.0147	*0.950*	0.0157	*0.985*	0.0109	*0.674*
Sis714	-0.0194	*-1.163*	0.0589	*3.379*	-0.0202	*-1.213*	0.0665	*3.566*
Male1559	0.0310	*2.765*	-0.0123	*-1.102*	0.0317	*2.848*	-0.0095	*-0.804*
Fem1559	-0.0034	*-0.294*	0.0077	*0.674*	-0.0075	*-0.640*	0.0040	*0.329*
Old60	0.0192	*1.041*	-0.0299	*-1.742*	0.0132	*0.706*	-0.0383	*-2.110*
Selfagro	0.0929	*2.868*	-0.0229	*-0.681*	0.0998	*3.036*	-0.0254	*-0.696*
Selfbus	-0.1628	*-3.930*	0.0604	*1.402*	-0.1622	*-3.893*	0.0629	*1.375*
Mheadeco	-0.0001	*-0.002*	-0.1417	*-4.257*	0.0134	*0.379*	-0.1188	*-3.445*
Muslim	0.0605	*1.826*	0.0637	*2.140*	0.0454	*1.358*	0.0363	*1.156*
Catho	0.0106	*0.311*	0.1823	*5.148*	-0.0077	*-0.227*	0.1610	*4.348*
Protes	0.0770	*2.271*	0.2446	*7.339*	0.0601	*1.766*	0.2269	*6.526*
Ochris	-0.0088	*-0.283*	0.1375	*4.448*	-0.0256	*-0.813*	0.1281	*3.966*
Landsize	-0.0000	*-0.112*	0.0000	*0.093*	0.0000	*0.091*	0.0000	*0.280*
Animal	0.0020	*0.641*	-0.0133	*-6.940*	0.0031	*0.992*	-0.0125	*-6.148*
Rcoastal	0.1224	*3.667*	0.0619	*2.060*	0.0763	*2.136*	0.0090	*0.271*
Rforest	0.1505	*5.644*	0.2280	*8.463*	0.1260	*4.620*	0.2059	*7.106*
Tschexp	-	-	-	-	0.0605	*3.357*	0.0396	*2.131*
Distance	-	-	-	-	-0.0007	*-2.155*	-0.0014	*-5.172*
Smiss2	-	-	-	-	0.2577	*1.597*	-0.5376	*-2.889*
ρ	-0.0217	*-0.537*			-0.1228	*-2.969*		
lnL		-2717.1				-2638.1		
lnL(=0)		-3330.4				-3330.4		
Sample Size		2578				2578		

Table 10: Determinants of Labour Force Participation and School Participation, Male Children Aged 7-14

	Model 1 (Urban + Rural)				Model 2 (Rural only)			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-4.0827	*-1.094*	-1.9400	*-5.461*	-9.9333	*-1.862*	-2.3111	*-4.656*
Agey	0.1042	*2.146*	0.1609	*3.567*	0.1042	*1.552*	0.1934	*2.972*
Agey2	-0.0027	*-1.170*	-0.0073	*-3.357*	-0.0022	*-0.685*	-0.0086	*-2.766*
Relson	-0.0898	*-1.865*	-0.0384	*-0.895*	-0.0884	*-1.293*	-0.1137	*-1.880*
MotherIn	0.0900	*2.614*	0.0043	*0.132*	0.1030	*2.095*	-0.0002	*-0.004*
FatherIn	-0.0812	*-1.924*	0.1048	*3.021*	-0.1411	*-2.363*	0.1825	*3.563*
Med1	-0.0369	*-1.022*	0.0396	*1.060*	-0.0492	*-0.989*	0.0701	*1.277*
Med2	-0.0550	*-1.685*	0.1539	*3.949*	-0.0788	*-1.665*	0.1863	*3.284*
Med3	-0.0611	*-0.565*	0.0158	*0.190*	0.0048	*0.031*	0.0767	*0.435*
Fed1	-0.0272	*-0.649*	0.0190	*0.453*	-0.0430	*-0.739*	0.0340	*0.590*
Fed2	-0.0223	*-0.814*	0.0676	*2.423*	-0.0411	*-1.059*	0.0610	*1.611*
Fed3	-0.0796	*-1.628*	0.1193	*2.348*	-0.1124	*-1.604*	0.1256	*1.523*
Lnpcwell	0.4456	*0.721*	0.0858	*3.943*	1.3786	*1.553*	0.1100	*3.877*
Lnpcwell2	-0.0189	*-0.737*	-	-	-0.0582	*-1.581*	-	-
Child06	0.0094	*1.037*	0.0015	*0.169*	0.0166	*1.316*	-0.0011	*-0.088*
Bro714	0.0080	*0.546*	0.0163	*1.176*	0.0295	*1.345*	0.0161	*0.695*
Sis714	-0.0148	*-0.861*	0.0152	*0.890*	-0.0214	*-0.844*	0.0362	*1.350*
Male1559	0.0220	*1.954*	-0.0198	*-1.982*	0.0278	*1.678*	-0.0229	*-1.505*
Fem1559	-0.0069	*-0.597*	0.0086	*0.799*	-0.0101	*-0.620*	0.0087	*0.559*
Old60	0.0204	*1.014*	-0.0441	*-2.650*	0.0420	*1.536*	-0.0539	*-2.413*
Selfagro	0.1180	*3.576*	-0.0651	*-2.072*	0.0742	*1.580*	-0.0849	*-1.759*
Selfbus	-0.0971	*-2.363*	0.0083	*0.234*	-0.1685	*-2.857*	0.0202	*0.331*
Mheadeco	0.0392	*1.068*	-0.0614	*-2.052*	0.0501	*0.978*	-0.1313	*-3.031*
Muslim	-0.0098	*-0.294*	0.0773	*2.686*	0.0295	*0.626*	0.0769	*1.909*
Catho	-0.0546	*-1.600*	0.1452	*4.022*	-0.0415	*-0.873*	0.1822	*3.751*
Protes	0.0199	*0.564*	0.1732	*4.790*	0.0529	*1.089*	0.2194	*4.686*
Ochris	-0.0522	*-1.673*	0.1258	*4.024*	-0.0452	*-1.009*	0.1488	*3.441*
Landsize	-0.000005	*-0.031*	0.00008	*0.453*	0.000005	*0.026*	0.0001	*0.490*
Animal	0.00009	*0.027*	-0.0093	*-4.769*	0.0010	*0.252*	-0.0117	*-5.251*
Accra	-0.5972	*-4.029*	0.1409	*2.057*	-	-	-	-
Town	-0.2317	*-5.983*	0.0796	*2.186*	-	-	-	-
Rcoastal	0.0650	*1.713*	0.0304	*0.883*	0.0511	*1.008*	0.0132	*0.307*
Rforest	0.0891	*3.034*	0.1696	*5.371*	0.0917	*2.335*	0.1951	*5.026*
Tschexp	0.0643	*3.507*	0.0176	*1.064*	0.0989	*3.963*	0.0170	*0.769*
Distance	-0.0007	*-2.145*	-0.0011	*-3.316*	-0.0008	*-1.704*	-0.0014	*-3.384*
Smiss2	0.5180	*3.166*	-0.3983	*-2.450*	0.6508	*2.920*	-0.4584	*-2.182*
ρ	-0.1776	*-3.331*			-0.1473	*-2.495*		
lnL	-1682.8				-1352.7			
lnL(=0)	-2264.1				-1716.2			
Sample Size	1971				1357			

Table 11: Determinants of Labour Force Participation and School Participation, Female Children Aged 7-14

	Model 1 (Urban + Rural)				Model 2 (Rural only)			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-12.2130	*-2.893*	-2.8953	*-6.505*	-14.7970	*-2.551*	-3.5985	*-5.746*
Agey	0.2029	*3.871*	0.2285	*4.130*	0.2568	*3.462*	0.2867	*3.766*
Agey2	-0.0075	*-3.042*	-0.0112	*-4.246*	-0.0094	*-2.686*	-0.0139	*-3.828*
Relson	0.0014	*0.031*	0.0553	*1.080*	-0.0176	*-0.265*	-0.0241	*-0.354*
MotherIn	-0.0138	*-0.379*	-0.0353	*-0.851*	-0.0056	*-0.111*	-0.0677	*-1.304*
FatherIn	-0.0942	*-2.332*	0.0837	*1.890*	-0.0836	*-1.437*	0.1542	*2.372*
Med1	0.0104	*0.286*	0.1240	*2.574*	0.0126	*0.236*	0.0727	*1.120*
Med2	0.0079	*0.242*	0.1387	*3.456*	-0.0038	*-0.079*	0.1872	*3.101*
Med3	0.0593	*0.713*	0.0757	*0.867*	-	-	-	-
Fed1	-0.0232	*-0.598*	0.2022	*3.680*	-0.0423	*-0.763*	0.2074	*2.885*
Fed2	-0.0374	*-1.362*	0.1456	*4.447*	-0.0094	*-0.245*	0.1425	*3.390*
Fed3	-0.1461	*-3.078*	0.1948	*3.788*	-0.1807	*-2.465*	0.2514	*3.309*
Lnpcwell	1.7969	*2.536*	0.0779	*3.122*	2.1062	*2.164*	0.1045	*2.981*
Lnpcwell2	-0.0756	*-2.556*	-	-	-0.0873	*-2.153*	-	-
Child06	-0.0146	*-1.425*	-0.0172	*-1.563*	-0.0152	*-1.012*	-0.0159	*-1.004*
Bro714	0.0094	*0.580*	0.0093	*0.572*	0.0059	*0.247*	0.0056	*0.243*
Sis714	-0.0168	*-0.992*	0.0508	*2.478*	-0.0231	*-0.983*	0.0887	*3.049*
Male1559	0.0152	*1.426*	-0.0063	*-0.494*	0.0300	*1.933*	0.0098	*0.530*
Fem1559	0.0078	*0.683*	-0.0065	*-0.466*	-0.0031	*-0.175*	-0.0079	*-0.418*
Old60	0.0050	*0.258*	-0.0154	*-0.661*	-0.0174	*-0.643*	-0.0150	*-0.492*
Selfagro	0.1145	*3.524*	0.0160	*0.418*	0.1301	*2.707*	0.0343	*0.626*
Selfbus	-0.0774	*-2.093*	0.0845	*2.119*	-0.1540	*-2.523*	0.1077	*1.579*
Mheadeco	0.0278	*0.792*	-0.0309	*-0.810*	-0.0177	*-0.352*	-0.1045	*-1.864*
Muslim	0.0235	*0.666*	0.0048	*0.127*	0.0592	*1.202*	-0.0150	*-0.304*
Catho	0.0439	*1.243*	0.1107	*2.620*	0.0331	*0.651*	0.1201	*2.125*
Protes	0.0504	*1.436*	0.1855	*4.429*	0.0764	*1.546*	0.2336	*4.215*
Ochris	-0.0033	*-0.102*	0.1085	*2.853*	-0.0010	*-0.021*	0.0900	*1.835*
Landsize	-0.00005	*-0.264*	0.00007	*0.294*	0.00001	*0.047*	0.000003	*0.012*
Animal	0.0060	*1.580*	-0.0132	*-2.164*	0.0078	*1.662*	-0.0135	*-1.903*
Accra	-0.1561	*-2.526*	-0.0349	*-0.489*	-	-	-	-
Town	-0.1480	*-3.974*	0.0265	*0.578*	-	-	-	-
Rcoastal	0.1084	*2.810*	-0.0227	*-0.510*	0.1051	*2.073*	-0.0251	*-0.477*
Rforest	0.1569	*5.290*	0.1717	*4.505*	0.1702	*4.351*	0.2003	*4.592*
Tschexp	0.0101	*1.292*	0.0925	*4.371*	0.0363	*2.694*	0.1087	*3.565*
Distance	-0.0005	*-1.294*	-0.0012	*-3.465*	-0.0004	*-0.890*	-0.0012	*-3.016*
ρ	-0.1340	*-2.496*			-0.1140	*-1.836*		
lnL		-1706.0				-1255.7		
lnL(=0)		-2218.2				-1601.6		
Sample Size		1840				1221		

For instance the educated father variable has a negative effect mainly on girl child labor and positive effect on girl's school attendance than males. Male headed households also show lower probability for labor force participation of a boy child than a girl child. We had already observed that the girl child going to school is highly probable when the mother is the head of the household. The Christian children were more likely to attend school, but this relationship was much stronger in rural areas than urban areas.

Housekeeping activities were not included as apart of labor force participation as they are not strictly income generating activities. However, as we observed in descriptive statistics, girls were predominantly involved in domestic chores which were equally involving and time consuming and hence prevented them from schooling. We also noted that when we take household chores into account, girl children have a very high labor force participation rate than boys. However, when we included the household chores together with labor force participation, except for the gender effect we could observe from the tabular results in section 3, we did not find too many inferences. The results indicate that girls are more likely to work, the presence of children less than 6 years increasing the probability of working and not schooling, the presence of female adults increased the probability of schooling and not working etc. It was also noted that not being the son or daughter of the head makes the child more likely to participate in work and not in school. All these findings further expound what we have already observed and do not contradict.

We already mentioned that the econometric strategy we adopted enables us to test the interdepdenecies of schooling and labor force participation choices in the household context. Hence a significant negative relationship of the ρ would indicate that there is a trade off between these choices and they compete with each other as opposing choices. The ρ coefficients in our estimates are negative, although their value (strength) differs between different sub-samples. ρ is high for urban than rural areas and high for older children and male children, showing the stark nature of trade off. However the ρ is the labor force model with housekeeping chores is not significantly different from zero, which implies that the broad definition of work is not at odds with schooling or it is possible to have household chores and schooling without any costly trade

off (Table A5). Therefore, housekeeping activities are independent of the decision concerning school as opposed to the relationship of school attendance vis-à-vis labor force participation.

6. Conclusions and Recommendations

One out of every four children works in Ghana in either a labor market or an household enterprise, while one out of every five children goes to school and works. Three out of every boy child was attending school, while it was slightly lower for girls. The probability of children's labor participation declines with rising levels of household welfare, although this relationship is very weak. The corresponding relationship with schooling shows that school participation clearly increases with welfare levels indicating the burden of schooling expenses on poor families. Households who earn a larger share of their income from family enterprises, farming or otherwise, are likely to have a greater demand for labor and have a higher probability of obtaining them within the household as it is cheaper and flexible. This results in high child labor participation in rural farming and urban informal sector, making the efficacy of legislation questionable.

Child labor and schooling increase with the age of the child. Child labor is not independent of the decision to school. Hence, addressing school participation can not be independent of demand side issues. The high cost of schooling pushes children into the labor market to enable them to afford school or pulls them away from school as they can not afford it. Hence, the official and unofficial fee charged for schooling is negatively correlated with school participation. Apart from reducing the cost, the school system needs to be flexible enough to recognize and adapt according to the constraints of schooling in rural communities. The quality of education and its relevance to the labor market needs to be given priority in future education reforms to ensure improvement in public perception, which plays a key role in the decision to send children to school (Glewwe, 1996).

Fathers with relatively high level of education have a significant negative influence on the likelihood of the child working; this effect is stronger for girls than boys. Therefore, adult literacy can also be useful in reducing child labor indirectly. Children in households where the father is present are less likely to participate in the labor market and more likely to be enrolled in school.

Religion and region of residence are important in explaining variations in both labor force and school participation rates; Christians families have a positive impact on schooling, especially in rural areas.

It is clear from the dynamics of child labor that the elimination of child labor needs sensitive government intervention because:

- existing laws and decrees need to be policed for implementation;
- if the government does not provide arbitrage no one else will provide it;
- the removal of barriers to attain broader human capital development is critical for broad based economic growth; and
- increasing school participation can realize high private and social returns to education.

Ghana's challenge of human capital development is clearly out of reach at current rates of child labor and non-school attendance in Ghana. A mix of legislation to prevent child labor and incentives to attend schooling is necessary to meet Ghana's developmental challenge for the twenty-first century.

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Annex 1: Definition of Variables used in Probit

Dependent variables
Labour: 1 if worked in the last 7 days; 0 otherwise
School7: 1 if went to school in the last 7 days; 0 otherwise
LabourHk: 1 if Labour=1 or have participated in housekeeping activities; 0 otherwise

Child characteristics
Agey: age in years
Male: 1 if male; 0 if female
Relson: 1 if head's son or daughter; 0 otherwise

Parent characteristics
MotherIn: 1 if mother present in the household; 0 otherwise
FatherIn: 1 if father present in the household; 0 otherwise
Med0: 1 if mother has no finished primary education or formal education; 0 otherwise (reference group)
Med1: 1 if mother had completed primary education; 0 otherwise
Med2: 1 if mother had completed middle secondary education; 0 otherwise
Med3: 1 if mother have some post middle secondary education; 0 otherwise
Fed0: 1 if father has no finished primary education or formal education; 0 otherwise (reference group)
Fed1: 1 if father had completed primary education; 0 otherwise
Fed2: 1 if father had completed middle secondary education; 0 otherwise
Fed3: 1 if father have some post middle secondary education; 0 otherwise

Household characteristics
Lnpcwell: welfare measure (total household real expenditure, per capita, in log)
Mheadeco: 1 if the economic head is male; 0 otherwise
Child06: number of sibling aged between 0 and 6
Bro714: number of brother aged between 7 and 14
Sis714: number of sister aged between 7 and 14
Male1559: number of male adult aged between 15 and 59
Female1559: number of female adult aged between 15 and 59
Old60: number of elderly aged over 60 or more
Muslim: 1 if Muslim; 0 otherwise
Catho: 1 if Catholic; 0 otherwise
Protes: 1 if Protestant; 0 otherwise
Ochrist: 1 if Other Christian; 0 otherwise
Animist: 1if Animist/Traditional; 0 otherwise (reference group)
Selfagro: 1 if self-employment in agriculture is the main source of income ; 0 otherwise
Selfbus: 1 if self-employment in non-agriculture enterprise is the main source of income ; 0 otherwise
Landsize: farming land area (in acres)
Animal: number of draught animals and cattle

Cluster characteristics
Accra: 1 if household resides in Accra; 0 otherwise
Town: 1 if household resides in Urban area outside Accra; 0 otherwise
Rcoastal: 1 if household resides in Rural Coastal area; 0 otherwise
Rforest: 1 if household resides in Rural Forest area; 0 otherwise
Rsavannah: 1 if household resides in Rural Savannah area; 0 otherwise (reference group)
Tschexp: schooling expenditures (fees+books+clothes+other expenditures) (cluster median)
Distance: distance to the local school in minutes (cluster median)
Smiss2: 1 if the school supply variables (Tschexp and Distance) are missing; 0 otherwise

Annex 2: Descriptive statistics of variables used in Probit

Variables	Urban		Rural		Boys		Girls		Total	
	mean	st. dev.	mean	st. dev.	mean	st. dev.	mean	st. dev.	mean	st. dev.
Labour	0.08	0.27	0.38	0.48	0.29	0.46	0.27	0.44	0.28	0.45
School7	0.83	0.38	0.68	0.47	0.77	0.42	0.68	0.47	0.73	0.45
LabourHk	0.90	0.31	0.88	0.33	0.85	0.35	0.91	0.28	0.88	0.32
Agey	10.46	2.25	10.22	2.27	10.31	2.29	10.28	2.24	10.30	2.26
Male	0.50	0.50	0.53	0.50	1.00	0.00	0.00	0.00	0.52	0.50
Relson	0.78	0.41	0.79	0.41	0.80	0.40	0.77	0.42	0.78	0.41
MotherIn	0.73	0.45	0.74	0.44	0.74	0.44	0.74	0.44	0.74	0.44
FatherIn	0.55	0.50	0.63	0.48	0.63	0.48	0.58	0.49	0.60	0.49
Med0	0.49	0.50	0.76	0.42	0.68	0.47	0.67	0.47	0.68	0.47
Med1	0.12	0.32	0.10	0.29	0.10	0.30	0.10	0.30	0.10	0.30
Med2	0.30	0.46	0.13	0.34	0.18	0.38	0.20	0.40	0.19	0.39
Med3	0.09	0.28	0.01	0.09	0.03	0.18	0.03	0.18	0.03	0.18
Fed0	0.31	0.46	0.55	0.50	0.48	0.50	0.46	0.50	0.47	0.50
Fed1	0.07	0.25	0.08	0.27	0.07	0.25	0.09	0.28	0.08	0.26
Fed2	0.40	0.49	0.30	0.46	0.33	0.47	0.33	0.47	0.33	0.47
Fed3	0.22	0.41	0.07	0.26	0.12	0.32	0.12	0.32	0.12	0.32
Wpcec	196611	125866	180069	110111	183887	116396	187064	114931	185421	115687
Mheadeco	0.48	0.50	0.67	0.47	0.63	0.48	0.59	0.49	0.61	0.49
Child06	1.28	1.35	1.52	1.23	1.45	1.32	1.44	1.23	1.44	1.28
Bro714	0.45	0.91	0.42	0.71	0.47	0.81	0.39	0.74	0.43	0.78
Sis714	0.38	0.68	0.35	0.64	0.36	0.65	0.36	0.65	0.36	0.65
Male1559	1.27	1.22	1.21	1.03	1.26	1.12	1.19	1.08	1.23	1.10
Fem1559	1.61	1.01	1.53	1.01	1.55	1.03	1.56	0.99	1.56	1.01
Old60	0.22	0.45	0.35	0.59	0.32	0.56	0.30	0.54	0.31	0.55
Catho	0.15	0.35	0.14	0.35	0.13	0.34	0.15	0.35	0.14	0.35
Protes	0.18	0.39	0.18	0.38	0.17	0.37	0.19	0.39	0.18	0.38
Ochris	0.33	0.47	0.24	0.42	0.26	0.44	0.27	0.44	0.27	0.44
Muslim	0.25	0.43	0.15	0.36	0.19	0.39	0.17	0.38	0.18	0.39
Animist	0.08	0.27	0.29	0.45	0.23	0.42	0.22	0.41	0.22	0.42
Selfagro	0.16	0.36	0.69	0.46	0.53	0.50	0.50	0.50	0.52	0.50
Selfbus	0.48	0.50	0.18	0.38	0.27	0.44	0.29	0.45	0.28	0.45
Landsize	5.94	34.60	18.30	75.95	14.69	66.29	13.88	65.16	14.30	65.74
Animal	0.18	1.78	0.98	3.90	0.81	3.63	0.63	3.08	0.72	3.38
Accra	0.21	0.40	0.00	0.00	0.06	0.24	0.07	0.26	0.07	0.25
Town	0.79	0.40	0.00	0.00	0.25	0.43	0.27	0.44	0.26	0.44
Rcoastal	0.00	0.00	0.19	0.40	0.14	0.34	0.13	0.33	0.13	0.34
Rforest	0.00	0.00	0.43	0.49	0.30	0.46	0.28	0.45	0.29	0.45
Rsav	0.00	0.00	0.38	0.48	0.26	0.44	0.25	0.44	0.26	0.44
Tschexp	11971	8414	4827	3778	7027	6416	7257	6816	7138	6612
Distance	34.27	16.05	29.66	36.35	31.10	29.69	31.20	33.01	31.15	31.33
Smiss2	0.01	0.09	0.03	0.18	0.02	0.14	0.03	0.16	0.02	0.15
Sample Size	1233		2578		1971		1840		3811	

Table A3: Determinants of Labour Force Participation and School Participation, Children Aged 7-10

	Model 1 (Urban + Rural)				Model 2 (Rural only)			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-4.1894	*-1.391*	-2.1153	*-6.557*	-7.8369	*-1.835*	-2.6232	*-6.071*
Agey	0.0586	*7.432*	0.0489	*5.082*	0.0756	*6.717*	0.0572	*4.285*
Male	0.0068	*0.397*	0.0939	*4.283*	0.0206	*0.844*	0.0983	*3.377*
Relson	-0.0224	*-0.558*	0.0836	*1.722*	-0.0351	*-0.625*	0.1060	*1.596*
MotherIn	0.0175	*0.574*	-0.0533	*-1.375*	0.0263	*0.622*	-0.1014	*-2.009*
FatherIn	-0.0484	*-1.424*	0.0765	*1.908*	-0.0524	*-1.078*	0.1173	*1.971*
Med1	-0.0251	*-0.885*	0.1296	*2.976*	-0.0431	*-1.029*	0.0937	*1.628*
Med2	-0.0090	*-0.339*	0.1808	*4.473*	-0.0047	*-0.116*	0.2848	*4.605*
Med3	-0.0487	*-0.661*	0.0295	*0.345*	-0.1173	*-0.689*	0.1092	*0.482*
Fed1	-0.0237	*-0.729*	0.0825	*1.855*	-0.0495	*-1.042*	0.0950	*1.631*
Fed2	-0.0329	*-1.435*	0.0855	*2.827*	-0.0405	*-1.224*	0.0955	*2.399*
Fed3	-0.1155	*-2.765*	0.1729	*3.165*	-0.1565	*-2.468*	0.2091	*2.560*
Lnpcwell	0.5010	*0.999*	0.1080	*4.459*	1.0070	*1.415*	0.1338	*4.156*
Lnpcwell2	-0.0209	*-1.003*	-	-	-0.0417	*-1.410*	-	-
Child06	0.0071	*0.942*	-0.0100	*-0.978*	0.0075	*0.688*	-0.0183	*-1.292*
Bro714	0.0093	*0.620*	0.0066	*0.367*	0.0184	*0.765*	0.0001	*0.004*
Sis714	-0.0088	*-0.544*	0.0361	*1.700*	-0.0160	*-0.663*	0.0716	*2.250*
Male1559	0.0091	*0.965*	-0.0178	*-1.590*	0.0148	*1.053*	-0.0018	*-0.107*
Fem1559	-0.0099	*-0.908*	0.0044	*0.331*	-0.0158	*-1.006*	0.0134	*0.726*
Old60	0.0010	*0.059*	-0.0183	*-0.933*	0.0057	*0.242*	0.0028	*0.108*
Selfagro	0.0900	*3.362*	-0.0495	*-1.396*	0.0879	*2.225*	-0.0358	*-0.674*
Selfbus	-0.0719	*-2.197*	0.0694	*1.791*	-0.1232	*-2.491*	0.0949	*1.431*
Mheadeco	-0.0063	*-0.207*	-0.0210	*-0.608*	-0.0268	*-0.633*	-0.0823	*-1.599*
Muslim	-0.0280	*-0.980*	0.0937	*2.847*	0.0057	*0.139*	0.0784	*1.748*
Catho	0.0061	*0.220*	0.1337	*3.543*	-0.0132	*-0.326*	0.1497	*2.962*
Protes	0.0148	*0.528*	0.2488	*6.407*	0.0169	*0.415*	0.2862	*5.694*
Ochris	-0.0176	*-0.672*	0.1536	*4.567*	-0.0253	*-0.659*	0.1567	*3.479*
Landsize	0.00004	*0.276*	-0.0001	*-0.438*	0.0001	*0.441*	-0.0001	*-0.480*
Animal	0.0022	*0.752*	-0.0157	*-3.342*	0.0033	*0.863*	-0.0209	*-3.665*
Accra	-0.1259	*-1.976*	0.0428	*0.595*	-	-	-	-
Town	-0.1389	*-4.123*	0.0747	*1.815*	-	-	-	-
Rcoastal	0.0789	*2.483*	0.0054	*0.141*	0.0804	*1.842*	-0.0107	*-0.233*
Rforest	0.1558	*6.350*	0.1622	*4.753*	0.1905	*5.778*	0.1829	*4.454*
Tschexp	0.0560	*3.591*	0.0403	*2.014*	0.1033	*4.827*	0.0562	*2.051*
Distance	-0.0002	*-0.762*	-0.0014	*-4.792*	-0.0002	*-0.335*	-0.0017	*-4.851*
Smiss2	0.4115	*3.030*	-0.3894	*-2.032*	0.6454	*3.445*	-0.3387	*-1.357*
ρ	-0.1291	*-2.362*			-0.0852	*-1.445*		
lnL		-1763.6				-1409.0		
lnL(=0)		-2356.7				-1825.0		
Sample Size		2116				1480		

Table A4: Determinants of Labour Force Participation and School Participation, Children Aged 11-14

	Model 1 (Urban + Rural)				Model 2 (Rural only)			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*	Marginal Effect	*t-ratio*
Constant	-11.8590	*-2.290*	-0.9257	*-2.890*	-17.0300	*-2.646*	-1.1004	*-2.494*
Agey	0.0379	*2.997*	-0.0233	*-2.196*	0.0448	*2.831*	-0.0296	*-1.970*
Male	0.0122	*0.478*	0.1318	*5.793*	0.0345	*1.066*	0.1380	*4.409*
Relson	-0.0840	*-1.517*	-0.0628	*-1.307*	-0.0587	*-0.805*	-0.2222	*-3.295*
MotherIn	0.0735	*1.716*	0.0102	*0.279*	0.0671	*1.210*	0.0156	*0.316*
FatherIn	-0.1467	*-2.997*	0.1071	*2.650*	-0.1998	*-3.178*	0.2103	*3.535*
Med1	0.0065	*0.141*	0.0399	*0.931*	0.0148	*0.252*	0.0479	*0.757*
Med2	-0.0284	*-0.708*	0.1106	*2.836*	-0.0748	*-1.365*	0.0928	*1.586*
Med3	0.0822	*0.737*	0.0677	*0.775*	-	-	-	-
Fed1	-0.0386	*-0.771*	0.1373	*2.808*	-0.0505	*-0.804*	0.1463	*2.192*
Fed2	-0.0345	*-1.032*	0.1296	*4.180*	-0.0234	*-0.553*	0.1228	*2.994*
Fed3	-0.1318	*-2.259*	0.1448	*3.034*	-0.1223	*-1.613*	0.1840	*2.490*
Lnpcwell	1.8960	*2.198*	0.0499	*2.145*	2.7319	*2.550*	0.0750	*2.385*
Lnpcwell2	-0.0797	*-2.218*	-	-	-0.1147	*-2.570*	-	-
Child06	-0.0138	*-1.136*	-0.0051	*-0.506*	-0.0031	*-0.198*	0.0035	*0.249*
Bro714	0.0084	*0.501*	0.0164	*1.242*	0.0140	*0.642*	0.0135	*0.717*
Sis714	-0.0211	*-1.130*	0.0379	*2.287*	-0.0278	*-1.191*	0.0649	*2.701*
Male1559	0.0351	*2.640*	-0.0130	*-1.136*	0.0505	*2.812*	-0.0144	*-0.849*
Fem1559	0.0140	*1.117*	0.0016	*0.138*	-0.0005	*-0.029*	-0.0085	*-0.528*
Old60	0.0294	*1.260*	-0.0525	*-2.592*	0.0191	*0.643*	-0.0798	*-3.009*
Selfagro	0.1546	*4.004*	0.0025	*0.072*	0.1154	*2.187*	-0.0079	*-0.157*
Selfbus	-0.1040	*-2.260*	0.0228	*0.629*	-0.1899	*-2.794*	0.0092	*0.140*
Mheadeco	0.0877	*2.053*	-0.0548	*-1.628*	0.0795	*1.441*	-0.1410	*-2.907*
Muslim	0.0363	*0.910*	0.0021	*0.063*	0.0708	*1.381*	-0.0068	*-0.153*
Catho	-0.0348	*-0.793*	0.1252	*3.021*	-0.0125	*-0.226*	0.1463	*2.610*
Protes	0.0562	*1.289*	0.1010	*2.666*	0.1122	*2.080*	0.1412	*2.757*
Ochris	-0.0539	*-1.397*	0.0658	*1.844*	-0.0459	*-0.913*	0.0658	*1.382*
Landsize	-0.0001	*-0.648*	0.0007	*1.569*	-0.0001	*-0.437*	0.0006	*1.362*
Animal	0.0027	*0.548*	-0.0074	*-3.239*	0.0038	*0.685*	-0.0069	*-2.561*
Accra	-0.5721	*-5.968*	0.0684	*1.028*	-	-	-	-
Town	-0.2492	*-5.894*	0.0498	*1.195*	-	-	-	-
Rcoastal	0.0821	*1.736*	0.0255	*0.607*	0.0547	*0.984*	0.0171	*0.339*
Rforest	0.0468	*1.293*	0.1910	*5.272*	0.0218	*0.510*	0.2191	*5.203*
Tschexp	0.0079	*0.794*	0.0689	*3.972*	0.0273	*1.895*	0.0788	*3.402*
Distance	-0.0016	*-3.315*	-0.0008	*-2.412*	-0.0017	*-3.071*	-0.0009	*-2.092*
ρ	-0.1778	*-3.278*			-0.1773	*-2.732*		
lnL		-1607.6				-1176.8		
lnL(=0)		-2079.9				-1426.9		
Sample Size		1695				1098		

Table A5: Determinants of Labour Force Participation (including housekeeping activities) and School Participation, Children Aged 7-14

	Model 1 (Urban + Rural)				Model 2 (Rural only)			
	Labour Force Participation		School Participation		Labour Force Participation		School Participation	
Independent Variable	β - coefficient	*t-ratio*	β - coefficient	*t-ratio*	β - coefficient	*t-ratio*	β - coefficient	*t-ratio*
Constant	-4.9121	*-4.491*	-7.7317	*-8.258*	-5.7986	*-2.646*	-8.3653	*-7.337*
Agey	0.8528	*5.675*	0.6473	*5.490*	0.8443	*4.457*	0.7037	*4.810*
Agey2	-0.0310	*-4.165*	-0.0307	*-5.445*	-0.0305	*-3.249*	-0.3301	*-4.707*
Male	-0.2304	*-3.434*	0.3742	*7.178*	-0.3049	*-3.528*	0.3378	*5.431*
Relson	-0.3006	*-1.956*	0.0366	*0.331*	-0.3739	*-1.830*	-0.2016	*-1.493*
MotherIn	0.1430	*1.334*	-0.0567	*-0.649*	0.0781	*0.585*	-0.0975	*-0.965*
FatherIn	-0.1624	*-1.324*	0.3226	*3.472*	-0.0959	*-0.553*	0.5137	*4.215*
Med1	0.0059	*0.049*	0.2800	*2.840*	0.0175	*0.111*	0.2296	*1.882*
Med2	0.0055	*0.050*	0.4792	*5.188*	0.0115	*0.075*	0.5644	*4.600*
Med3	-0.1148	*-0.624*	0.1862	*0.932*	0.1289	*0.230*	0.6333	*0.770*
Fed1	-0.0087	*-0.062*	0.3840	*3.499*	0.0261	*0.156*	0.3682	*2.815*
Fed2	0.0435	*-0.442*	0.3572	*5.038*	0.0134	*0.107*	0.3025	*3.641*
Fed3	-0.2900	*-2.244*	0.5207	*4.410*	-0.4681	*-2.587*	0.5347	*3.269*
Lnpcwell	0.0090	*0.138*	0.2797	*5.136*	0.0401	*0.458*	0.3225	*4.916*
Child06	0.0115	*0.417*	-0.0263	*-1.130*	0.0777	*2.139*	-0.0261	*-0.892*
Bro714	0.0083	*0.181*	0.0440	*1.273*	0.0324	*0.433*	0.0329	*0.693*
Sis714	0.0439	*0.716*	0.1169	*2.792*	0.0127	*0.160*	0.1958	*3.520*
Male1559	0.0181	*0.499*	-0.0454	*-1.704*	0.0228	*0.480*	-0.0271	*-0.776*
Fem1559	-0.2123	*-5.970*	0.0165	*0.574*	-0.2202	*-4.688*	0.0134	*0.377*
Old60	-0.0702	*-1.048*	-0.1099	*-2.360*	0.0668	*-0.809*	-0.1123	*-2.075*
Selfagro	0.1598	*1.562*	-0.0914	*-1.119*	0.3008	*2.210*	-0.0754	*-0.697*
Selfbus	-0.2233	*-2.133*	0.1578	*1.802*	-0.2618	*-1.546*	0.1906	*1.400*
Mheadeco	0.0371	*0.353*	-0.1498	*-1.910*	-0.0862	*-0.572*	-0.3545	*-3.448*
Muslim	0.0003	*0.003*	0.1713	*2.184*	0.1589	*1.309*	0.1087	*1.160*
Catho	0.0474	*0.394*	0.4592	*4.989*	-0.0093	*-0.065*	0.4808	*4.324*
Protes	0.2595	*2.197*	0.6057	*6.816*	0.2854	*2.013*	0.6797	*6.559*
Ochris	0.1967	*1.746*	0.4002	*4.992*	0.2301	*1.600*	0.3801	*3.998*
Landsize	-0.0004	*-0.989*	0.0002	*0.599*	-0.0006	*-1.185*	0.0001	*0.334*
Animal	-0.0006	*-0.071*	-0.0373	*-6.690*	0.0088	*0.669*	-0.0377	*-6.555*
Accra	0.0964	*0.548*	0.2633	*1.697*	-	-	-	-
Town	0.1101	*0.957*	0.2564	*2.623*	-	-	-	-
Rcoastal	-0.0575	*-0.487*	0.0748	*0.803*	0.0206	*0.158*	0.0271	*0.274*
Rforest	0.4461	*4.079*	0.6155	*7.639*	0.5272	*4.301*	0.6168	*7.206*
Tschexp	0.1596	*2.874*	0.1082	*2.358*	0.2203	*3.166*	0.1124	*3.032*
Distance	-0.0005	*-0.389*	-0.0041	*-5.371*	0.0000	*0.022*	-0.0042	*-5.234*
Smiss	11.2714	*2.568*	-1.7504	*-3.507*	1.6947	*2.799*	-1.6265	*-2.932*
ρ	-0.0721	*-1.452*			-0.0035	*-0.061*		
lnL		-2663.7				-1832.1		
lnL(=0)		-3507.9				-2486.7		
Sample Size		3811				2578		

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